



“EARLY CHOLECYSTECTOMY VERSUS CONSERVATIVE TREATMENT FOR GALLBLADDER MUCOCELE”

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ABSTRACT

Background: Gallbladder mucocele refers to an advanced and possibly severe gallbladder disease, which can result in major complications, unless treated in a proper manner. The most effective time of treatment is controversial as well as the method.

Purpose: To evaluate the clinical outcomes of early cholecystectomy and conservative treatment of patients having gallbladder mucocele.

Methods: This is a prospective comparative observational research done at Kishwar Fazal Teaching Hospital Sheikhpura, between November, 2024 and April, 2025. A total of 90 adult patients having gallbladder mucocele were split into two groups, early cholecystectomy in 72hrs and non-surgical care. Measures such as symptom managing, and complication and length of stay were examined.

Findings: The patients who received early cholecystectomy documented better complete symptom clearance, reduced complications, and hospitalization. A significant percentage of the conservative population had to have late in life surgery because of a breakdown in treatment.

Conclusion: Early cholecystectomy offers better clinical results and it ought to be a choice with the right patient with gallbladder mucocele.

Keywords: *Gallbladder mucocele; Early cholecystectomy; Conservative treatment; Laparoscopic surgery; Clinical outcomes.*

INTRODUCTION

Gallbladder mucocele is an extreme and possibly grave form of gallbladder pathology, which involves an unusual buildup of thick mucus in the lumen of the gallbladder, resulting in gradual distension, inflammation, ischemia and perforation. Historically, the treatment of gallbladder diseases was conservatively carried out in the selective population with respect to high-risk groups of patients considered to be at risk of surgery. Nevertheless, recent studies are raising the question of the safety and efficacy of extended conservative treatment because of repeated symptoms, complications, and repeatable admissions to the hospital. The C-GALL study, which is a large randomized trial, has shown that conservative management of symptomatic gallbladder disease is linked to increased rates

of symptom recurrence and gallbladder-related complications compared to laparoscopic cholecystectomy, supporting the argument of the need to intervene definitively and at an earlier stage (1). Such findings are especially applicable when one takes into account the case of gallbladder mucocele which is frequently the late or complicated form of a disease and is not necessarily a benign one.

Despite the fact that the phenomenon of gallbladder mucocele is more actively introduced in the literature of veterinary medicine, especially in the canine community, the pathophysiological processes of this phenomenon can help us to study human disease. Research indicates that chronic cystic ductal obstruction and dysmotility of the gallbladder lead to the formation of mucocèles, which lead to luminal progressive distension and compromise of the wall (2). The same mechanisms are noted in the long term history of long-lasting hydrops of the gallbladder and mucocele-like states in human beings, which can be clinically silent until they cause complications in the form of infection, rupture, or compression of surrounding organs. In case reports and case reviews, it is stressed that late diagnosis can make the treatment more complex and complicated to operate (3,4). The main advantage of laparoscopic cholecystectomy is that it is least invasive, the postoperative pain is minimal, shorter hospitalization and faster recovery have given it the gold standard of treatment of the gallbladder disease. Large surgical series evidence shows, that early surgical intervention decreases inflammatory sequelae, complexity of operation, and general morbidity (5).

Conversely, conservative treatment plans such as antibiotics, analgesia and observation might provide temporary relief of the symptoms but not the underlying pathology, permitting the disease to progress. The comparative analysis of early and delayed laparoscopic cholecystectomy in acute cholecystitis always demonstrates that an early intervention is related to fewer days in a hospital and similar or even less complications (6). The worries about the feasibility and safety of early cholecystectomy especially beyond the first 72 hours of symptoms onset induce some delay or conservative care in the past. Nonetheless, recent findings in tertiary and suburban hospitals indicate that laparoscopic cholecystectomy is still possible and safe even when the symptom has lasted and those with complications (7). This is particularly applicable in gallbladder mucocele in which delay can further enhance distension of the gallbladder and deteriorate chances of perforation or biliary obstruction. Uncommon but devastating complications include gastric outlet obstruction due to the obstruction of the gallbladder by hydrops, which further highlights the risks of long-term conservative care (8).

Temporizing measures in high-risk or critically ill patients have been suggested using lower risk measures like percutaneous gallbladder aspiration or cholecystostomy. Comparative studies have also reported that though such interventions can stabilize patients in the short term, they are not ultimately effective and have been linked to their reoccurrence and catheter related complications (9). This observation has been made over the prospective comparative studies done to assess early and interval cholecystectomy which support early definitive surgery as long as it is possible (10). The results support the requirement of uniform treatment pathways that prevent avoidable interruptions in surgical services. Absence of consistent diagnostic and management guidelines on the gallbladder diseases such as mucocele has remained a contributing factor to variable clinical outcomes. Standardization advocates put forward on early diagnosis, prompt surgical referral and non-prolonged conservative therapy among the appropriate candidates (11). Several studies that have compared early cholecystectomy within the 72 hours of admission to late surgery in the first week of admission have shown positive results associated with early intervention which included less inflammation and technical challenge (12). Also previously treated as a relative contraindication, previous upper abdominal surgery is no longer regarded as an important obstacle to successful laparoscopic cholecystectomy in expert hands (13).

Although surgical methods have developed, the bile duct injury is also an issue of concern when dealing with complicated cases of a gallbladder disease. However, the contemporary endoscopic and surgical approaches have greatly enhanced the treatment of injuries of the bile ducts that are related to surgery and have led to less morbidity in the long run (14). Abnormal anatomies and abnormal presentations including twisted and distended gallbladders make it clear that early surgical intervention is needed before anatomy becomes deformed due to chronic inflammation (15). The

accumulating literature is a strong advocate in favor of the laparoscopic cholecystectomy in the acute gallbladder disease as a safe and effective practice (16). Future randomized trials are proving that early laparoscopic cholecystectomy has more desirable patient outcomes than delayed surgery without any increase in complications (17). Such advantages are spread among various groups of patients, such as pediatric ones, where early surgical treatment has been proved to be practical and safe (18). Retrospective studies also support the fact that inflamed gallbladders may be treated effectively even in case of surgery at any time, as long as there is sufficient experience (19). Altogether, these results can indicate that early cholecystectomy can have a great benefit over conservative treatment in patients with gallbladder mucocele, especially decrease the complications, hospitalization, and recurrence of the disease.

Objective: To compare early cholecystectomy with conservative treatment in patients with gallbladder mucocele, evaluating clinical outcomes, complication rates, hospital stay, and overall effectiveness of both management approaches.

MATERIALS AND METHODS

Study Design: Prospective Comparative Observational study design.

Study Settings: Kishwar Fazal Teaching Hospital Sheikhpura.

Duration of Study: The study was conducted over a six-month period from November, 2024 to April, 2025.

Sample Size: The sample size was 90 patients who comprised 30 oral and maxillofacial surgery patients, 30 general medicine patients and 30 general surgery patients. The sample was chosen based on feasibility, the adequacy of the department, in regards to the number of patients, and similar interprofessional education research.

Inclusion Criteria: Both males and females aged 18 years and above who presented with gallbladder mucocele and were found to have used the condition on the basis of clinical presentation and radiographic evidence were recruited. The patients who showed up with right upper quadrant pain, the presence of gallbladder distension on ultrasonography, and laboratory findings that indicated gallbladder pathology were all eligible. Patients with a hemodynamic status and deemed suitable to undergo either the conservative therapy or surgery were also included in the study.

Exclusion Criteria: Patients with suspected or confirmed malignancy of the gallbladder, generalized peritonitis and perforation of the gallbladder on presentation were excluded. The patients with severe cardiopulmonary comorbidities that made them unfit to undergo anesthesia, pregnant women, and patients who lost track or did not provide consent were also not included in the study.

Methods

Informed consent was obtained and eligible patients were enrolled and divided into two groups according to the first management strategy. Group A was comprised of patients who have undergone early cholecystectomy with 72 hours of diagnosis and Group B was comprised of patients who received conservative management with intravenous antibiotics, analgesic, hydration, and close clinical follow-up. A structured proforma was used to record baseline demographic data, clinical presentation, lab finding, and radiological features. The conservative group patients were monitored regularly with regard to the resolution of symptoms or progression and discharged to surgical treatment in case of clinical deterioration. The surgical group received operative information, intraoperative observations, postoperative complications, and hospital stay. Every patient underwent follow up up to discharge and the results of treatment were also compared between the two groups regarding the symptom resolution, incidence of complication and length of stay.

Results

The study involved 90 patients with a diagnosis of the gallbladder mucocele, and they were split into two groups equally. Group A (n = 45) was early cholecystectomized within 72 hours of diagnosis and Group B (n = 45) was given conservative treatment that involved intravenous antibiotics, analgesia, hydration, and close observation. No significant differences were found between the two groups in terms of baseline demographic and clinical characteristics with age, gender distribution, and the presenting symptoms not showing significant differences.

Table 1. Baseline Demographic and Clinical Characteristics of Patients

Variable	Group A (Early Cholecystectomy) n=45	Group B (Conservative Treatment) n=45
Mean age (years)	46.8 ± 11.2	48.1 ± 10.6
Male	21 (46.7%)	23 (51.1%)
Female	24 (53.3%)	22 (48.9%)
Right upper quadrant pain	45 (100%)	45 (100%)
Gallbladder distension on USG	45 (100%)	45 (100%)
Raised inflammatory markers	31 (68.9%)	33 (73.3%)

The two groups had a significant difference in clinical outcomes. Early cholecystectomy patients were found to have much higher complete resolution of symptoms and reduced complications as compared to patients who were handled conservatively. The proportion of patients with persistent or recurrent symptoms and requiring delayed surgical intervention was significant in the conservative group during the same admission or on follow-up.

Table 2. Comparison of Clinical Outcomes Between Study Groups

Outcome	Group A n=45	Group B n=45
Complete symptom resolution	42 (93.3%)	24 (53.3%)
Persistent symptoms	3 (6.7%)	21 (46.7%)
Conversion to surgery	—	18 (40.0%)
Overall complications	4 (8.9%)	14 (31.1%)

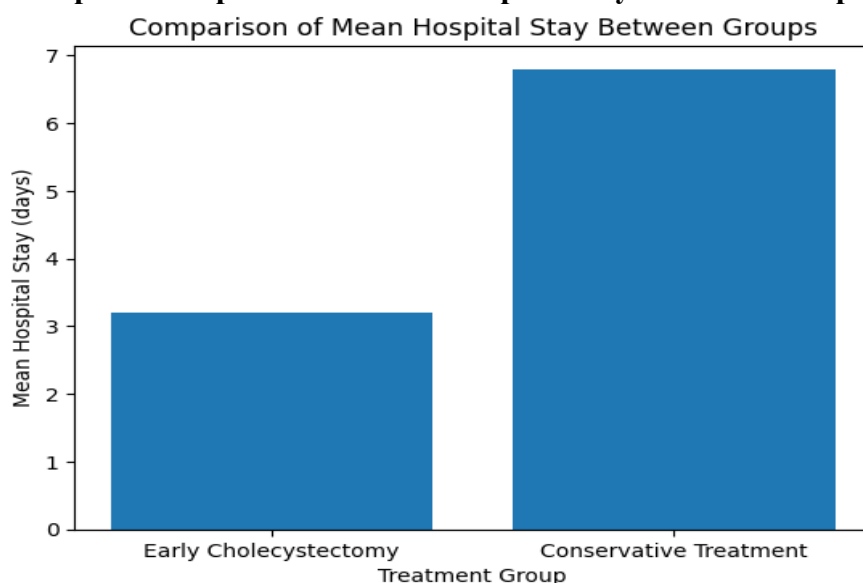
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Table 3. Length of Hospital Stay and Complications

Parameter	Group A	Group B
Mean hospital stay (days)	3.2 ± 1.1	6.8 ± 2.4
Minor complications	3 (6.7%)	9 (20.0%)
Major complications	1 (2.2%)	5 (11.1%)

Patients who underwent early cholecystectomy had a significantly shorter hospital stay compared with those treated conservatively, highlighting the efficiency of early surgical management.

Graph 1. Comparison of Mean Hospital Stay Between Groups



Discussion

The current research compared the early cholecystectomy to conservative treatment among patients with the diagnosis of gallbladder mucocele and proved that early surgical treatment is linked to improved clinical outcomes, complications, and a much shorter period of hospitalization. These data contribute to the accumulating evidence which is proving the need to take early definite measures to complicate the gallbladder disease instead of its long-term conservative treatment that in most cases does not solve the underlying pathology and exposes the patients to the development and re-emergence of the disease. Among the most notable results of the study, the significantly increased rate of full recovery of the symptoms in patients who have undergone an early cholecystectomy than in those who were treated conservatively should be mentioned. Over 90 percent of patients undergoing early surgery experience were able to have full relief of the symptoms, as compared to almost half of patients undergoing conservative treatment in which the experience of persistent or recurrent symptoms remained. This fact is congruent with the C-GALL trial results, indicating that subjected to conservative treatment of sympathetic gallbladder disease, the symptoms of the disease and gallbladder-related complications occurred more frequently (1). Gallbladder mucocele is a more developed pathology and hence conservative treatment is even less probable to achieve permanent symptom control.

The problem of a greater rate of complications in the conservative treatment group also indicates the weakness of non-operative management of the gallbladder mucocele. Problems like repeat biliary pain, secondary infection and development of acute cholecystitis were far more common in those that were handled conservatively in this study. These observations can be described by the prior reports that offer the progressive nature of gallbladder mucocele which develops due to the chronic obstruction of the cystic ducts, gallbladder dysmotility resulting in luminal distension, ischemia and inflammation (2). Late intervention permits the progression of pathological changes that predisposes the development of severe complications such as perforation and obstruction of the biliary (3,4). On the contrary, those complications observed in the early cholecystectomy group were less and minor. This is evidence of the safety of early laparoscopic cholecystectomy despite a complex gallbladder pathology in patients. Clinical series in which surgical interventions are performed in early infancy have shown that early intervention decreases the complexity of the surgical exercise because of the absence of dense adhesions and distortion in the anatomy due to the chronic inflammation (5).

The current research is in line with comparative research of early versus late laparoscopic cholecystectomy in acute cholecystitis, which all experience similar or less complication rates with early laparoscopic surgery (6). The other finding that was clinically significant was the significantly reduced hospital stay among patients who had early cholecystectomy. The average time of hospital stay by the surgical group was lower than that of the conservative group. Long-term stay of conservatively treated patients could be explained by frequent symptoms, multiple imaging, inability of medical treatment, and subsequent delayed surgery. Such reflections have been made in studies carried out in tertiary hospitals that show that early laparoscopic cholecystectomy has a lower total hospital stay and healthcare costs and does not increase morbidity (7). In the context of health system, a shorter hospitalization would result in decreased resource use and better patient turnover.

Significant percentage of patients who were initially treated in a conservative manner eventually needed surgical intervention because of clinical difference or inability to resolve the symptoms. The result highlights the inefficiency of conservative treatment in the case of gallbladder mucocele and advances the arguments of early definitive treatment. Other investigations on minimally invasive temporizing interventions like percutaneous gallbladder aspiration or cholecystostomy have also shown that short-term recurrence was high and long-term performance was low (9). Although these methods might be suitable to critically ill or unfit patients, they cannot be used to substitute definite surgery in patients who qualify as a surgical patient. Early cholecystectomy beyond the conventional 72 hours has been a concern with regard to feasibility and safety and this has always been a factor in delayed management. Nevertheless, recent findings prove that laparoscopic cholecystectomy is also safe and possible even in patients who have a long-term period of the appearance of the symptoms, when there is sufficient surgical competence (7).

This point of view is further supported by the results of this paper since early surgery was linked with good results and low complications. The innovations in laparoscopy procedure and perioperative nursing have greatly minimized the risks that were once linked to early surgical intervention (12). This research also lends credence to the recommendation of standard management protocols in the area of the gallbladder disease. The lack of consistency in the diagnostic criteria and treatment pathways remains a contributor to the lack of consistency (11). Early diagnosis of mucocele of the gallbladder and early referral to surgery can help to avoid the development of the diseases and lower morbidity. Moreover, the issue of injury to the bile duct, which is a crucial factor in the gallbladder surgery, should not be used as a reason not to operate in time since modern surgical and endoscopic procedures have greatly enhanced the management and outcomes of these complications (14). This study has some limitations despite its strengths. Observational design and use of single center setting could be a weakness in the generalizability of the findings. Also, the data of long-term follow-ups were not provided, which may further elucidate the recurrence-rates and late complications. It is suggested that future multicenter randomized research studies with a prolonged follow-up time can confirm these results and enhance the evidence base.

Conclusion

The present research proves that early cholecystectomy is safe, effective and definitive approach to the treatment of patients with gallbladder mucocele. In comparison to the conservative management, early surgical intervention offered much higher complete symptom resolution, reduced number of complications and a very noticeable reduction in hospital stay. Persistent or recurrent symptoms, a significant requirement of delayed surgical intervention was often linked to conservative treatment, indicating that it is rather ineffective in treating underlying pathology. Early cholecystectomy helped to prevent the course of the disease, minimize morbidity, and enhance the overall clinical outcome without adding to the risk of the operation. These results are in line with the increasing body of evidence which is in favor of early conclusive surgical treatment of complicated gallbladder disease. Early cholecystectomy in clinically appropriate surgical patients with the case of gallbladder mucocele should be viewed as an option of choice in preventing complication, lessening health care expenditure, and improving patient outcomes. More multicenter studies over extended periods should be encouraged to reinstate these conclusions.

References

1. Ahmed I, Hudson J, Innes K, Hernández R, Gillies K, Bruce R, Bell V, Avenell A, Blazeby J, Brazzelli M, Cotton S. Effectiveness of conservative management versus laparoscopic cholecystectomy in the prevention of recurrent symptoms and complications in adults with uncomplicated symptomatic gallstone disease (C-GALL trial): pragmatic, multicentre randomised controlled trial. *bmj*. 2023 Dec 6;383.
2. Gookin JL, Mathews KG, Seiler G. Diagnosis and management of gallbladder mucocele formation in dogs. *Journal of the American Veterinary Medical Association*. 2025 Mar 19;1(aop):1-9.
3. Zubi AR, Adam IM, Abdulla IS, Nuha H, Ubaid A, Abdulla IS. Laparoscopic Management of Long-Standing Gallbladder Hydrops: A Case Report and Literature Review. *Cureus*. 2025 Sep 19;17(9).
4. Zubi AR, Adam IM, Abdulla IS, Nuha H, Ubaid A. Laparoscopic Management of Long-Standing Gallbladder Hydrops: A Case Report and.
5. Qandeel H, Hayyawi I, Nassar AH, Ng HJ, Khan KS, Hasanat S, Ashour H. The Rationale of sub-hepatic drainage on a specialist biliary unit: a review of 6140 elective and urgent laparoscopic cholecystectomies and bile duct explorations. *Langenbeck's Archives of Surgery*. 2024 Sep 5;409(1):271.
6. Kumar A, Nandini SO, Shayana A. A COMPARATIVE STUDY OF EARLY AND DELAYED LAPAROSCOPIC CHOLECYSTECTOMY IN MANAGEMENT OF ACUTE CHOLECYSTITIS. *Int J Acad Med Pharm*. 2024;6(2):990-6.
7. Mohammad S, Ullah AA, Shawon GM, Rahman MA, Kaikobad MN. Feasibility of laparoscopic cholecystectomy in acute cholecystitis with or without complications after 72 hours of onset of symptoms: our experience in a suburban tertiary hospital. *East West Medical College Journal*. 2025 Jul 2;13(2):103-8.
8. Haji AG, John AR, Elhassan A, Zohdy M, Haider SI, Lourdusamy S, Piramanayagam B. A Rare Case of “Gastric Outlet Obstruction Secondary to Hydrops of Gallbladder” Caused by Recurrent Acalculous Cholecystitis: A Variant of Bouveret’s Syndrome-A Rare Case and Review of Literature. *Surg. Gastroenterol*. 2023;28(4):243-7.
9. Abd Alhussein M, Mahdi MA. Comparative analysis of percutaneous gallbladder aspiration vs percutaneous cholecystostomy in acute calculous cholecystitis. *Anaesthesia, Pain & Intensive Care*. 2024 Dec 23;28(6):1077-83.
10. Ahmedabad G, Gajjar DJ. A PROSPECTIVE COMPARATIVE STUDY BETWEEN EARLY AND INTERVAL LAPAROSCOPIC/OPEN CHOLECYSTECTOMY IN PATIENTS OF ACUTE CHOLECYSTITIS.
11. Doherty G, Manktelow M, Skelly B, Gillespie P, Bjourson AJ, Watterson S. The need for standardizing diagnosis, treatment and clinical care of cholecystitis and biliary colic in gallbladder disease. *Medicina*. 2022 Mar 5;58(3):388.
12. Ayman AA, Elkhayyal AW, Hossam SA, Hesham MO. The outcome of laparoscopic cholecystectomy within the first 72 hours of acute cholecystitis versus laparoscopic cholecystectomy performed after 72 hours till the end of the first week. *The Medical Journal of Cairo University*. 2022 Jun 1;90(6):1013-20.
13. Saad Beih KM, Habe AA, Alsaied T, Mokhtar MM. Outcomes of Laparoscopic Cholecystectomy in patients with Previous Upper Abdominal Surgery. *Zagazig University Medical Journal*. 2024 Dec 1;30(9.1):4829-41.
14. Emara MH, Ahmed MH, Radwan MI, Emara EH, Basheer M, Ali A, Elfert AA. Post-cholecystectomy iatrogenic bile duct injuries: Emerging role for endoscopic management. *World Journal of Gastrointestinal Surgery*. 2023 Dec 27;15(12):2709.
15. Khatri N, Abdile A, Welsh F, Smith N. The simple gallbladder with a twist?. *The New Zealand Medical Journal (Online)*. 2024 Apr 12;137(1593):81-4.

16. Elsaadi N. Acute gallbladder disease–The virtue of performing a laparoscopic cholecystectomy in the early stages of case management.
17. Lal S, Rohitaj R, Najim M, Dua M, Chakravarti S. Early and Delayed Laparoscopic Cholecystectomy in Acute Calculus Cholecystitis: A Prospective Randomized-comparative Study. *World Journal of Laparoscopic Surgery*. 2022 Mar 5;14(3):149-56.
18. Wani AH, Arya N, Singh G, Singh A, Hussain Z. LAPAROSCOPIC CHOLECYSTECTOMY FOR CHOLELITHIASIS IN PAEDIATRIC POPULATION. OUR EXPERIENCE IN A TERTIARY CENTRE. *International Journal of Medicine and Public Health*. 2025 Jan;15(1):755-
19. Karuppasamy P, Ananthamurugan E, Sivachandran K. MANAGEMENT OF INFLAMED GALLBLADDERS REGARDLESS OF TIME FRAME-A RETROSPECTIVE STUDY. *Int J Acad Med Pharm*. 2023;5(6):120-5.